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ADVISORY CIRCULAR



DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Washington, D.C.

FAR GUIDANCE MATERIAL

Subject: LARGE AND TURBINE-POWERED MULTIENGINE AIRPLANES, PART 91, SUBPART D

1. PURPOSE. This advisory circular (AC) sets forth guidelines and procedures to assist operators of large or turbojet or turbopropeller-powered multiengine airplanes in meeting the safety requirements of Federal Aviation Regulations (FAR) Part 91, Subpart D, and associated regulations.

2. CANCELLATION. AC 91-38 dated 12/13/72 is canceled.

3. RELATED REGULATIONS. FAR Parts 23, 25, 37, 43, 61, 65, 91, 129, 135, 137, 145, and Civil Air Regulations (CAR) 3 and 4b.

4. BACKGROUND. Even though Subpart D of FAR 91 has been in effect since mid-1972, problems persist in the general understanding of the regulation, various operational procedures and limitations, inspection program selection and use, and inspection program development and approval. These problems are due, in part, to personnel turnover in the industry, to new developments in aircraft usage, and to changes in the regulations. These problems, and others, have highlighted the need for expanded guidance material which this document provides.

5. APPLICABILITY, OPERATIONS. The operating rules of FAR 91, Subpart D, are applicable to operations conducted with the following airplanes, when those operations are not required to be conducted under the provisions of 14 CFR Parts 121, 123, 129, 135, or 137:

a. Civil airplanes of U.S. registry having a maximum certificated takeoff weight of 12,500 lbs. or more (large).

b. Turbojet-powered multiengine civil airplanes of U.S. registry regardless of weight.

NOTE: Turbopropeller-powered airplanes are not turbojet-powered and the operational rules are not applicable unless the turbo-propeller-powered airplanes are large (see subparagraph a).

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6. COMPENSATION FOR EXPENSES (FAR Part 91, Section 91.181(b), (c), and (d)). Some misconceptions exist regarding expenses which may be charged and when such charges are appropriate. Section 91.181(d) is specific as to the items which may be charged. The items specified may only be charged as expenses of a specific flight when that flight is:

a. A demonstration of the airplane to a prospective customer (Section 91.181(b)(3));

b. For the carriage of property by a person in the furtherance of a business (Section 91.181(b)(7)).

7. SURVIVAL EQUIPMENT FOR OVERWATER OPERATIONS. FAR Part 91, Section 91.189, requires airplanes operated under FAR 91, Subpart D, to be equipped with specific items of survival equipment for certain clearly defined overwater flights. Questions have arisen, however, regarding types of equipment which satisfactorily meet the requirements. These questions are answered as follows:

a. Flotation equipment requirements for individuals (Section 91.189(a)) may be met by using:

(1) Flotation devices approved under FAR 37, Section 37.178, and marked TSO-C72b.

(2) Flotation devices approved under FAR 37, Section 37.123, and marked TSO-C13c.

b. Life preserver requirements of Section 91.189(b)(1) may be met by using:

(1) Life preservers (not other devices) approved under FAR 37, Section 37.178, and marked TSO-C-72b.

(2) Life preservers approved under FAR 37, Section 37.123, and marked TSO-C13c.

c. Survivor locator light requirements of Sections 91.189(b)(1) and 91.189(b)(2) may be met by lights approved under Section 37.191, and marked TSO-C85.

d. The liferaft requirements of Section 91.189(b)(2) may be met by using:

(1) Liferafts approved under FAR 37, Section 37.122, and marked TSO-C12c.

(2) Liferafts approved under FAR 37, Section 37.176, and marked TSO-C70.

e. Pyrotechnic signaling devices that have been accepted by an agency of the U.S. Government for sea rescue purposes are recommended for use in complying with Section 91.189(b)(3).

f. Emergency locator transmitters which are marked "TSO-C91" and are of the "automatic deployable type," as described in Section 37.200(b)(4), are recommended for use in complying with Section 91.189(b)(4).

8. RADIO EQUIPMENT REQUIREMENTS FOR OVERWATER OPERATIONS. Radio equipment requirements for overwater operations are set forth in FAR Part 91, Section 91.191. Two areas merit special attention. The first of these is the requirement that receivers be independent. Each installation should be investigated to ensure that receivers are independent of each other, including the fuses, and to ensure that a failure in one will not adversely affect the others. The second area is the recent adoption of new specifications for equipment performance when operations are conducted in certain North Atlantic airspace. The details of these new specifications are contained in Advisory Circular 91-49, General Aviation Procedures for Flight in North Atlantic Minimum Navigation Performance Specifications Airspace.

9. EMERGENCY EQUIPMENT. FAR Part 91, Section 91.193, requires airplanes operated under FAR 91, Subpart D, to be equipped with specific emergency equipment. The rule requires the emergency equipment to be readily accessible to the crew, and it is highly advisable that it be readily accessible to passengers as well. Since requirements change according to the aircraft configuration and use in the flight involved, attention to all of the provisions of Section 91.193 is required.

10. SECOND IN COMMAND REQUIREMENTS. Second in command requirements are set forth in FAR Part 91, Section 91.213. Qualifications for pilots serving as second in command are set forth in FAR Part 61.

11. OPERATIONS WHICH MAY BE CONDUCTED. Operations which may be conducted under FAR 91, Subpart D, are set forth in Section 91.181(b). It is important, however, that full consideration be given to FAR 91, Sections 91.181(c)(1), (2), and (3), when determining that an intended operation is authorized under FAR 91, Subpart D. Common carriage may not be involved.

12. CARRY-ON-BAGGAGE. FAR Part 91, Section 91.201, sets forth the responsibility of the pilot in command with respect to passenger carry-on-baggage and is very specific as to proper stowage. Carry-on-baggage can be a significant factor in the event of a minor accident, and proper stowage should be emphasized.

13. CARRIAGE OF CARGO. The carriage of cargo generally falls into two classifications, all cargo operations and cargo/passenger operations. Cargo location, packaging, and security are major considerations when cargo and passengers occupy the same compartments.

a. The certification requirements for cargo compartments are contained in FAR 23, Section 23.787, and FAR 25, Section 25.787, for small and transport category airplanes respectively, while Civil Air Regulations 3 and 4b respectively provide the same information for older models. Aircraft Specifications (or Type Certificate Data Sheets) and Airplane Operations Limitations provide information regarding cargo carriage in specific airplanes. FAR 91, Section 91.203, sets forth the rules regarding the carriage of cargo. The advent of unusual cargo has generated a need for broad consideration of the rules and structural limitations of the aircraft to ensure that safety is not compromised.

NOTE: When the passenger compartment of an airplane is used as a cargo compartment, the requirements for cargo compartments and all loading limitations are applicable.

b. Air shipment of livestock. CAR 4b and FAR 25 do not contain specific rules for the carriage of livestock; however, the rules pertinent to the design of cargo compartments apply to compartments for all types of cargo. The compartments should meet the requirements of CAR 4b.382 or Section 25.855 and be classified as class "E" in accordance with CAR 4b.383 or Section 25.857. Means should be provided to prevent shifting of the cargo under specified flight and ground load conditions.

(1) When vertical restraint is not provided for in a livestock installation, a determination should be made that lack of such provisions will not be hazardous to the airplane, its structure, its equipment, its crew or their function during negative "g" conditions expected in normal operations. Maneuvering loads less than zero "g" need not be considered. A combination of comprehensive gust analysis, assessment of affected structure, and appropriate operating restrictions have been found an adequate basis of approval for a number of designs without vertical restraint. For design of rearward and sideward restraints, a load factor of not less than 1.5g should be used. All occupants are to be protected from injury by cargo (all types) during a minor crash landing in accordance with CAR 4b.260 or Section 25.561 as appropriate. For airplanes certificated under the provisions of CAR 4b, in effect prior to March 5, 1952, the forward crash-load factor is 6g instead of 9g. For airplanes certificated under other parts prior to 1952, including Aeronautics Bulletin No. 7-A, the forward crash-load factor should be at least 6g. Means such as dividers, pens, or containers should be provided to restrain livestock so as to have minimum effect on the aircraft's center of gravity. Regulations require the center of gravity to be kept within limits at all times.

(2) Cargo compartment floor loading limits should not be exceeded. Special consideration should be given to cabin flooring when the cabin section is used for cargo. Where required, a means of protecting the floor structure, fuselage bulkheads, and fuselage sides from damage should be provided. Such installations normally require approval and their weight is to be considered. Provisions for the containment and disposal of livestock excreta should be made to prevent contamination and corrosion of the airplane systems,

equipment, and structures. Airworthiness personnel should be particularly alert to the effectiveness of these preventive measures and possible deleterious effects from contamination or corrosion.

(3) The operator should provide equipment, procedures, and instructions to control the high humidity and temperatures normally generated by livestock in confined spaces because of the adverse effects on aircraft systems, structures, cockpit environment, and the livestock itself. The Department of Agriculture has emphasized the importance of proper ventilation for livestock particularly during loading, unloading, and during fuel or maintenance stops. A United States Department of Agriculture Animal Health Division representative is normally available at ports of embarkation for consultation on environmental conditions required for animal health. A publication entitled "Transporting Livestock Overseas by Air," dated August 1970, is also available from the Agriculture Research Service, ARS 52-38, of the Department of Agriculture.

(4) When provisions for carriage of livestock involves a major alteration to the airplane, and most do, that alteration in all likelihood will require the issuance of a Supplemental Type Certificate (STC). Previous approvals, approved by other than STC procedures, will not necessarily be accepted as precedent for new approvals.

c. Other considerations in carriage of cargo.

(1) Protection of the aircraft and crew from the deleterious effects of gases, liquids, dust, etc., emanating from the cargo.

(2) Center of gravity shifts and/or weight changes which result from sublimation or melting of cooling materials, water run off, or absorption of water by the cargo.

(3) Application of loads to aircraft structural and nonstructural members when it has not been demonstrated to be satisfactory.

(4) Correct labeling of cargo to facilitate appropriate precautions by the aircraft crew and/or loaders.

(5) Crew access to cargo, cargo compartments, and provisions for crew emergency egress.

(6) Assurance that cargo does not interfere with or prevent normal or emergency operation of any aircraft system.

14. FOREIGN OPERATORS OF U.S.-REGISTERED AIRPLANES.

a. Foreign operators of U.S.-registered airplanes subject to FAR 91, Subpart D, who are not involved in common carriage, are required to operate those airplanes in accordance with Subpart D (see Section 91.1(a)(3)) and inspect them in accordance with FAR 91, Section 91.217.

b. Foreign operators of U.S.-registered airplanes subject to FAR 91, Subpart D, who are involved in common carriage and who hold operations specifications under FAR Part 129, are required to inspect the airplanes in accordance with Section 91.217.

c. Foreign operators of U.S.-registered large and turbine-powered (turbojet and turboprop) multiengine airplanes, involved in common carriage but not operated under Part 129 are required to inspect the airplanes under the inspection requirements of Subpart C of Part 91. If these operators wish to use an inspection program similar to those listed in Section 91.217, they would be required to be exempt from Sections 91.165 and 91.169. Such an exemption, if granted, would not make the operator subject to Section 91.217.

15. LIFE-LIMITED PARTS. FAR Part 91, Section 91.217(a), prohibits operation of airplanes, to which Subpart D applies, unless the replacement times for life-limited parts are complied with. Life-limited parts are identified in FAA-Type Certificate Data Sheets and in other documents approved by the Administrator; however, the specific term "life-limited" is not always used. Such terms as "maximum service life," "service limit," "life-limit," and others which convey the idea of a finite service period, are often used and also require compliance.

16. INSPECTION PROGRAM SELECTION.

a. Section 91.217 requires the registered owner or operator of an airplane, to which Subpart D applies, to select one of the five inspection programs, set forth in the section, and to inspect the airplane, including the airframe, engines, propellers, appliances, survival equipment, and emergency equipment, in accordance with the program selected. Options 1, 2, and 3 are programs previously approved for use by certificate holders under the provisions of FAR Parts 121, 135, and 123, respectively. Option 4 is an inspection program recommended by the manufacturer. These four types of inspection programs are acceptable, by rule, and require no further approval. Their use has presented very few problems, except in two areas:

(1) First is the requirement that programs selected under Sections 91.217(b)(1), (b)(2), and (b)(3) be programs which are currently in use (i.e., used to inspect airplanes which the program supplier inspects and operates under the terms of a Part 121, 135, or 123 certificate), and that a program selected under Section 91.217(b)(4) be one currently recommended by the manufacturer. Owners and operators should recognize that compliance with these currency requirements is their responsibility and that their interests would be best protected by formal arrangements with the program supplier to keep them abreast of program changes. The arrangements should also provide notification in the event the program supplier discontinues use of the program.

(2) The compatibility of the inspection program, selected under Section 91.217, and the airplane to be inspected is the second area that is problematical. Care should be exercised in selection to ensure:

(i) Sufficient similarity between the operations and the environment, for which the program was designed, and those anticipated under Section 91.217, to make the program economically practical.

(ii) That the program selected under Sections 91.217(b)(1), (b)(2), or (b)(3) is valid for the airplane to be inspected, and that it provides for complete inspection as required by Section 91.217(a); i.e., the airplane, engines, propellers, all appliances, emergency equipment, and survival equipment are the same on the airplane for which the program was designed, and that to be inspected. If the program selected does not fully meet this criteria, it may be modified as appropriate, submitted for approval, and used under the provisions of Section 91.217(b)(5).

(iii) That programs selected under Section 91.217(b)(4) provide complete coverage of the airplane. The airplane manufacturer, except for that installed at the factory, has no knowledge of the appliances, survival, or emergency equipment installed or carried on the airplane. Therefore, provisions for these items cannot be made in the recommended inspection program. A manufacturer's recommended program which does not cover all items specified in Section 91.217(a) may be supplemented to provide the required coverage by incorporating, as part of the program, inspection data recommended by the manufacturers of the appliances or equipment not covered. An inspection program supplemented in this manner remains an option (b)(4) program. Option (b)(4) programs supplemented or modified, other than as described in this paragraph, require approval under Section 91.217(b)(5).

NOTE: When both the airframe manufacturer and the appliance or equipment manufacturer provide inspection data, that of the airframe manufacturer should be used. This permits the airplane manufacturer to adjust the inspection to be compatible with the operational and environmental conditions imposed on the equipment or appliance by the airplane.

b. Owner or Operator-Developed Programs (Section 91.217(b)(5)). In the interest of providing maximum program flexibility and adaptability, Section 91.217(b)(5) provides the owner/operator the option of a self-developed inspection program. Program development is, however, no mean undertaking and requires an intimate knowledge of the airplane and its components. A sound knowledge and understanding of inspection procedures, techniques, and inspection system control is also required. Most persons developing a program under Section 91.217(b)(5) find adapting an existing program to their needs the most economically, and otherwise, practical avenue. When this course is chosen or if the inspection program is an original one, it is imperative that the complete airplane be covered by the inspection, and that facts and sound judgment form the basis for the inspection frequencies.

(1) Inspection program content (Section 91.217(e)(1) and (2)). These sections set forth the mandatory items to be included in an inspection program. They are:

(i) The instructions and procedures for the conduct of the inspection.

(ii) The necessary tests and checks to be made.

(iii) A detailed list of the parts and areas of the airframe, engines, propellers, appliances, and emergency equipment to be inspected.

(iv) A schedule for the performance of the inspection of the items listed. The schedule may be expressed in terms of time-in-service, calendar time, number of systems operations, or any combination of these.

(2) Additional program contents. There are a number of provisions and instructions which need to be included in an inspection program if that program is to meet the owner's/operator's responsibility and produce an airworthy airplane as required by Section 91.29, and other regulations. The best owner/operator control in meeting these responsibilities is obtained by using a single control document (i.e., the inspection program). These items are normally made a part of the "instructions and procedures" of the program required by Section 91.217(e)(1). Examples of some of these items are:

(i) Special inspection - following hard landings, overweight landings, turbulent air, extended out-of-service inspection, etc.

(ii) System for controlling life-limited parts.

(iii) Airworthiness Directive compliance control.

(iv) Recordkeeping requirements.

(v) Program change control (i.e., how revision to the program is made, approved, and recorded).

(vi) Program identification.

(vii) Any other special inspection required due to special operations or aircraft design.

17. REFERENCE MATERIAL. Inspection standards of performance, procedures, methods, instructions or other technical data may be included in an inspection program by reference, eliminating the expense and trouble of reprinting them. Such references should be specific (i.e., title of the document, appropriate paragraphs and revision date should be included). The referenced documents become a part of the inspection program and are subject to the provisions of Section 91.219.

18. INSPECTION PERFORMANCE STANDARDS. While it is not a regulatory requirement, the inspection performance standards should be included as part of the inspection program for the convenience of the users. This may be done

directly or by reference as indicated in paragraph 17. The standards of performance required by regulations are set forth in FAR 43, Sections 43.13(d)(1) through (d)(5), and vary with the inspection option selected. They are as follows:

a. Option 1. A program selected under Section 91.217(b)(1) must be accomplished to the standards set forth in Section 43.13(c). This is often overlooked and results in the belief that this option requires compliance with only the inspection portions of the certificated air carrier's continuous airworthiness program. However, a review of Section 43.13(c) reveals that the methods, techniques, and practices contained in the carrier's maintenance manual or maintenance part of the carrier's manual are also mandatory when this option is selected. This is also the case when the option 1 program is that of a commercial operator.

b. Option 2. The standards prescribed in Section 43.13(a) are applicable to a program selected under Section 91.217(b)(2). Inspection is a part of maintenance and the general performance standards of Section 43.13(b) also apply unless other standards acceptable to the Administrator are established by the inspection program.

c. Option 3. The standards prescribed in Section 43.15(a) are applicable to a program selected under Section 91.217(b)(3). The comments in paragraph b. above apply.

d. Option 4. A program selected under Section 91.217(b)(4) is to be accomplished to the standards recommended by the manufacturer of the aircraft, engine, propeller or appliance. (See note in paragraph 16(a)(2)(iii) for priority of standards application.)

e. Option 5. A program selected under Section 91.217(b)(5) is to be accomplished to the standards prescribed in Sections 43.13(a) and 43.13(b) as explained in paragraph 18.b. above, unless the inspection program for the particular airplane includes other standards.

19. NOTICE OF THE INSPECTION PROGRAM SELECTED. Section 91.217(c) requires notice of the inspection program selected to be given to the FAA district office having jurisdiction over the area in which the airplane is based. The airplane is considered to be based in the area in which the owner's or operator's main base of operation is located. The notification is to contain the information specified in Sections 91.217(c)(1) through (c)(4).

20. NOTICE OF CHANGE TO AN INSPECTION PROGRAM. An owner or operator who changes from one inspection program to another, or makes changes to an inspection program in use, is required by Section 91.217(d) to notify the FAA of the change. Changes do not require FAA approval, prior to use, if they are made to keep programs selected under Sections 91.217(b)(1), (2), (3) or (4), current or if the change is from a program selected under Sections 91.217(b)(1), (2), (3) or (4), to another of these options. Except for changes to keep programs current, it is not appropriate to make changes to

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programs selected under Sections 91.217(b)(1), (2), (3) or (4). Changes to these programs, except to keep them current, require the entire program to be submitted for approval under the provisions of Section 91.217(b)(5). Changes to programs selected under Section 91.217 (b)(5), which increase the calendar time, cycles, or hours of service between inspections of an item, or which delete an item to be inspected, require approval by the FAA prior to use of the changed inspection program.

21. CHANGES IN AIRPLANE OWNERSHIP. When an airplane, to which FAR 91, Subpart D applies, changes owner/operator, the new owner/operator is required to exercise an option under Section 91.217(b) and comply with the notification requirements of Section 91.217(c). If the option selected is Section 91.217 (b) (5), the approval requirements of that Section and the content requirements of Section 91.217(e) are applicable. It is entirely possible that the program, selected by the former owner/operator and approved for use, will be satisfactory for the use of the new owner/operator and can be approved by the FAA. However, this is not always true since consideration should always be given to the new operational and environmental factors. In any event, a Section 91.217(b)(5) program is to be identified as being that of the new owner/operator and submitted to the FAA for approval.

22. RECORD REQUIREMENTS. The recordkeeping and recording requirements for inspections performed under FAR 91, Subpart D, are contained in FAR Sections 43.9 and 91.173.

23. MAINTENANCE REQUIREMENTS. Except for inspection program requirements, FAR 91, Subpart D, does not, in itself, provide requirements for maintenance. The responsibility for maintenance is set forth in FAR 91, Section 91.163. FAR 91, Section 91.165, requires the correction of defects found during and between inspections. Some of the other provisions contained in Subpart C of FAR 91 are also applicable to operations conducted under FAR 91, Subpart D.



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